Compliance Summary

CHAPTER 2

Lawrence Livermore National Laboratory participates in numerous activities to comply with federal, state, and local environmental regulations as well as internal requirements and applicable U.S. Department of Energy (DOE) orders. The following describes regulations and guidance applicable to LLNL during 2005, including a summary of permits active in 2005, and inspections of the Livermore site and Site 300 by external agencies. The following summaries also provide references for more information where available.

Environmental Restoration and Waste Management

Comprehensive Environmental Response, Compensation and Liability Act

Ongoing groundwater investigations and remedial activities at the Livermore site and Site 300 are called the Livermore Site Ground Water Project (GWP) and the Site 300 CERCLA Project, respectively. These activities fall under the jurisdiction of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Title I of the Superfund Amendments and Reauthorization Act (SARA). As part of work on these projects, DOE and LLNL also continued to conduct community relations activities. CERCLA compliance activities are summarized in the following sections; program activities and findings are further described in Chapter 8.

Livermore Site Ground Water Project

The Livermore site became a CERCLA site in 1987 when it was placed on the National Priorities List. The GWP at the Livermore site complies with provisions specified in a federal facility agreement (FFA) entered into by the U.S. Environmental Protection Agency (EPA), DOE, the California EPA's Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). As required by the FFA, the project addresses compliance issues by investigating potential contamination source areas (such as suspected old release sites, solvent-handling areas, and leaking underground tank systems) through continuous monitoring and by the remediation of soil and groundwater. The primary soil and groundwater contaminants (constituents of concern) are volatile organic compounds (VOCs), primarily trichloroethylene (TCE) and perchloroethylene (PCE).

Significant 2005 Livermore site GWP restoration activities include installing one dual (groundwater and soil vapor) extraction well, three groundwater monitoring wells, eight soil vapor wells, and three anode wells; decommissioning three anode wells; conducting four hydraulic tests; and conducting 13 soil vapor extraction tests. LLNL met all regulatory milestones on schedule by activating a groundwater treatment facility (TF) at TFE Hotspot (TFE-HS) and soil vapor treatment facilities (VTFs) at VTFD East Traffic Circle South (VTFD-ETCS), VTFD Hotspot (VTFD-HS), VTFE Hotspot (VTFE-HS), and VTF406 Hotspot (VTF406-HS).

Treatment Facilities: In 2005, LLNL operated 27 groundwater treatment facilities in the TFA, TFB, TFC, TFD, TFE, TFG, and TFH (TF406, TF518, and TF5475) areas (**Figure 8-1**). The 77 groundwater extraction wells and 22 dual extraction wells produced more than 1.1 billion liters of groundwater at an average flow rate of about 2150 liters per minute, removing more than 71 kilograms of VOCs. For comparison, in 2004 the groundwater treatment facilities removed approximately 86 kilograms of VOCs. The smaller quantity of mass removed in 2005 is partially due to decreasing concentrations in the TFD and TFE source areas and declining extraction well flow rates due to remediation-induced dewatering at the site. Since remediation began in 1989, approximately 10.8 billion liters of groundwater have been treated, resulting in removal of more than 1168 kilograms of VOCs. See Chapter 8 for further information.

In 2005, LLNL also operated eight soil VTFs: VTFD East Traffic Circle South, VTFD Helipad, VTFD Hotspot, VTFE Eastern Landing Mat, VTFE Hotspot, VTF406 Hotspot, VTF518 Perched Zone, and VTF5475. The 20 soil vapor extraction wells and 22 dual extraction wells produced over 2.3 million cubic meters of soil vapor, and the treatment facilities removed more than 196 kilograms of VOCs. For comparison, in 2004 the soil vapor treatment facilities removed approximately 133 kilograms of VOCs. The

significantly higher rate of mass removal in 2005 (a 47% increase) is due to activation of four new vapor treatment facilities: VTFD-ETCS, VTFD-HS, VTFE-HS, and VTF406-HS. Since initial operation, approximately 5 million cubic meters of soil vapor have been extracted and treated, removing over 911 kilograms of VOCs from the subsurface. See Chapter 8 for further information.

Community Relations: Livermore site community relations activities in 2005 included communicating and meeting with neighbors and local, regional, and national interest groups and other community organizations; making public presentations; producing and distributing the Environmental Community Letter; maintaining the information repositories and the administrative record; conducting tours of site environmental activities; and responding to public and news media inquiries. In addition, DOE and LLNL met with members of Tri-Valley Communities Against a Radioactive Environment (Tri-Valley CAREs) and their scientific advisor as part of the activities funded by an EPA Technical Assistance Grant (TAG). Community questions were also addressed via electronic mail, and project documents, letters, and public notices were posted on a public website at www-envirinfo.llnl.gov.

Documentation: In 2005, DOE/LLNL submitted the *LLNL Ground Water Project 2004 Annual Report* (Karachewski et al. 2005) and quarterly self-monitoring reports on schedule. In addition, DOE/LLNL completed all 2005 Remedial Action Implementation Plan (Dresen et al. 1993) milestones on schedule.

Site Evaluations Prior to Construction: LLNL was placed on the National Priorities List in 1987 based on historical contamination of soil and groundwater. The *CERCLA Record of Decision for the Lawrence Livermore National Laboratory Livermore Site* (LLNL 1992) identifies selected remedial actions agreed upon by the EPA, SFBRWQCB, and DTSC. The Record of Decision requires that before any construction begins, the project site must be evaluated to determine if soil or rubble (concrete and asphalt) is contaminated. Soil is sampled and analyzed for potential radioactive and/or hazardous contamination. Depending on the potential for radioactive contamination, rubble may be either surveyed or analyzed for radioactivity. During 2005, soil and/or rubble were evaluated at 99 construction sites. Based on the evaluations, the soil and/or rubble were either reused on site or disposed of according to established procedures.

Site 300 CERCLA Project

Investigations and remedial activities are ongoing at Site 300, which became a CERCLA site in 1990, when it was placed on the National Priorities List. Investigations and remedial activities are conducted under the joint oversight

of the EPA, the Central Valley Regional Water Quality Control Board (CVRWQCB), DTSC, and the authority of an FFA for the site. (There are separate FFAs for Site 300 and the Livermore site.) The groundwater contaminants (constituents of concern) for Site 300 vary within the different environmental restoration operable units at the site. Background information for LLNL environmental characterization and restoration activities at Site 300 can be found in the *Final Site-Wide Remedial Investigation Report, Lawrence Livermore National Laboratory Site 300* (Webster-Scholten 1994) and *Final Site-Wide Feasibility Study for Lawrence Livermore National Laboratory Site 300* (Ferry et al. 1999).

Treatment Facilities and Field Investigations: VOCs (primarily TCE) are the main contaminants at Site 300. Explosives, tritium, depleted uranium, organosilicate oil, nitrate, and perchlorate are also found in the groundwater. Sixteen treatment facilities operated during 2005. Twenty-five wells that extract groundwater only, 7 wells that extract soil vapor only, and 24 wells that extract both groundwater and soil vapor operated during 2005, treating more than 100.3 million liters of groundwater. The 24 wells that extract both vapor and groundwater and the 7 wells that extract only vapor together removed 111,151 m^3 of vapor. In 2005, the Site 300 treatment facilities removed approximately 89.7 kilograms of VOCs, 0.089 kilograms of perchlorate, 739.7 kilograms of nitrate, 0.09 kilograms of RDX high explosive compound, and 0.41 kilograms of organic silicate oil. Since remediation efforts began in 1990, more than 1176 million liters of groundwater and approximately 528,196 million m^3 of vapor have been treated, to yield about 379.9 kilograms of removed VOCs, 0.397 kilograms of perchlorate, 3391 kilograms of nitrate, 0.57 kilograms of RDX high explosive compound, and 9.41 kilograms of organic silicate oil. See Chapter 8 for further information.

Community Relations: The Site 300 CERCLA project maintains continuing communications with the community of Tracy and nearby neighbors. Community relations activities in 2005 included maintenance of information repositories and administrative records; participation in community meetings; off-site, private well-sampling activities; mailings to stakeholders; and interviews with the news media. LLNL hosted TAG meetings with Tri-Valley CAREs. TAG meetings provided a forum for focused discussions on CERCLA activities at the various operable units at Site 300. Tri-Valley CARES receives the annual TAG grant from EPA to support an environmental consultant to review and comment on Site 300 CERCLA activities.

Documentation: In 2005, LLNL submitted all required documentation to oversight agencies by agreed upon regulatory submission dates. The *Final Remedial Investigation/Feasibility Study (RI/FS) for the Pit 7 Complex Operable Unit* (Taffet et al. 2005), *Draft Final Remedial Design for the Building 832 Operable Unit* (Madrid et al. 2005), *Annual 2004 Compliance*

Report for Lawrence Livermore National Laboratory Site 300 (Dibley et al. 2005a), *First Semester 2005 Compliance Report for Lawrence Livermore National Laboratory Site 300* (Dibley et al. 2005b), *Characterization Summary for the Building 812 Firing Table Area at Lawrence Livermore National Laboratory* (Ferry and Holtzapple 2005a), *Characterization Summary for the Sandia Test Site at Lawrence Livermore National Laboratory* (Ferry and Holtzapple 2005b), quarterly reports, and work plans were among the documents submitted.

Agency for Toxic Substances and Disease Registry Assessment

The Agency for Toxic Substances and Disease Registry (ATSDR) is an agency of the U.S. Public Health Service. Congress established ATSDR in 1980 as part of CERCLA, also known as the Superfund law.

Since 1986, amendments to the Superfund law have required ATSDR to conduct a public health assessment (PHA) at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out whether people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. In 2005, after more than ten years of investigating the public health impacts of various contaminants in and around the Livermore site and Site 300, the ATSDR completed its PHA for Site 300.[1] This PHA (ATSDR 2005) concluded that

> "... the environmental contamination related to Site 300 presents No Public Health Hazard based on the fact that exposure to contaminants from Site 300 is not occurring now, has not occurred in the past and is not expected to occur in the future...."

The ATSDR held a public meeting in Tracy on February 24, 2005, to discuss its findings and answer questions. The LLNL health consultations and assessments completed by ATSDR can be found at http://www.atsdr.cdc.gov/HAC/PHA/region_9.html#california.

[1] The PHA for the Livermore site was completed in 2004 and found "No Apparent Public Health Hazard."

Emergency Planning and Community Right-to-Know Act and Toxics Release Inventory Report

Title III of SARA is known as the Emergency Planning and Community Right-to-Know Act (EPCRA). It requires owners or operators of facilities that handle certain hazardous chemicals on site to provide information on the release, storage, and use of these chemicals to organizations responsible for emergency response planning. Executive Order 13148 directs all federal agencies to comply with the requirements of the EPCRA, including SARA Section 313, "Toxics Release Inventory (TRI) Program."

On June 22, 2005, LLNL submitted to the National Nuclear Security Administration (NNSA)/DOE the TRI Form R for lead detailing environmental release estimates for Site 300. (Form R is used for reporting TRI chemical releases including waste management and waste minimization activities.) With greater than 85% reduction in lead releases since TRI reporting year 2001, there continues to be a significant decline in the lead released at Site 300. This is directly attributable to the increased use of nonlead (frangible) and reduced-lead-containing ammunition.

EPCRA requirements and LLNL compliance are summarized in **Table 2-1**.

Table 2-1. Compliance with EPCRA

EPCRA requirement[a]	Brief description of requirement[a]	LLNL action
302 Planning Notification	Notify SERC of presence of extremely hazardous substances.	Originally submitted May 1987.
303 Planning Notification	Designate a facility representative to serve as emergency response coordinator.	Update submitted May 24, 2005.
304 Release Notification	Report releases of certain hazardous substances to SERC and LEPC.	No EPCRA-listed extremely hazardous substances were released above reportable quantities in 2005.
311 MSDS/Chemical Inventory	Submit MSDSs or chemical list to SERC, LEPC, and Fire Department.	Update submitted May 24, 2005.
312 MSDS/Chemical Inventory	Submit hazardous chemical inventory to local administering agency (county).	Business plans and chemical inventory submitted to San Joaquin County (January 17, 2005) and Alameda County (March 1, 2005).
313 Toxics Release Inventory	Submit Form R to U.S. EPA and California EPA for toxic chemicals released above threshold levels.	Form R for lead (Site 300 only) was submitted to DOE June 22, 2005; DOE forwarded it to U.S. EPA and California EPA June 28, 2005.

a See Acronyms and Abbreviations for list of acronyms.

Resource Conservation and Recovery Act and Related State Laws

The Resource Conservation and Recovery Act (RCRA) provides the framework at the federal level for regulating the generation, storage, treatment, and management of solid wastes, including wastes designated as hazardous. The California Hazardous Waste Control Act (HWCA) and the California Code of Regulations (CCR) Title 22 set requirements for managing hazardous wastes and implement RCRA in California. RCRA and HWCA also regulate hazardous waste treatment, storage, and disposal facilities, including permit requirements. Because RCRA program authorization was delegated to the State of California in 1992, LLNL works with DTSC to comply with federal and state issues and obtain hazardous waste permits.

Hazardous Waste Permits

Livermore Site: The hazardous waste management facilities at the Livermore site consist of permitted units located in Area 612 and Buildings 693, 695 and 696 (except for Room 1001) of the Decontamination and Waste Treatment Facility (DWTF). The units that were operated under interim status (Area 514 Facility and the Building 233 Container Storage Facility) have been relocated to permitted facilities. Building 233 and Area 514 are currently undergoing RCRA closure. Permitted waste management units include container storage, tank storage, and various treatment processes (e.g., wastewater filtration, blending, and size reduction). During 2004/2005, LLNL also submitted several Class 1 and Class 2 permit modification requests to DTSC; all Class 2 permit modifications were approved on December 9, 2005, and all except one of the requested Class 1 permit modifications were approved and implemented. The one Class 1 permit modification that was not approved was submitted to DTSC on August 5, 2005 as a modification to treat regulated wastes in up to 85-gallon containers within the Small Scale Treatment Laboratory (SSTL). Many of these modification requests are related to as-built changes and consolidation of storage and treatment of hazardous waste at the DWTF complex. On December 9, 2005, DTSC updated LLNL's Hazardous Waste Facility Permit (HWFP).

A final closure plan for the Building 419 Interim Status Facility was submitted to DTSC in February 2001. DTSC is continuing its review of this closure plan. LLNL has provided additional information requested by DTSC, including responding to Building 419 Notices of Deficiency (NODs) that DTSC issued in November 2004.

See **Table 2-2** for a summary of permits active in 2005. LLNL received no violations as a result of any of the three inspections DTSC conducted during 2005.

Table 2-2. Permits Active in 2005

Type of permit	Livermore site[a][b]	Site 300[a][b]
Hazardous waste	EPA ID No. CA2890012584. Hazardous Waste Facility Permit Number 99-NC-006 (RCRA Part B permit)—to operate hazardous waste management facilities including Buildings 693, 695, and 696, and Area 612. Activities authorized in these areas include treatment and storage of hazardous and mixed wastes subject to the conditions specified in the Part B permit. LLNL is also a Registered Hazardous Waste Hauler and is authorized to transport wastes from Site 300 to the Livermore site. Conditionally Exempt Specified Wastestream permit to mix resin in Unit CE231-1. Conditional Authorization Permit to operate sludge dewatering unit in Building 322A.	EPA ID No. CA2890090002. Part B Permit—Container Storage Area (Building 883) and Explosives Waste Storage Facility. Part B Permit—Explosives Waste Treatment Facility. Part B Permit—RCRA-Closed Building 829 Explosives Open Burn Facility, Post-Closure Permit.
Medical waste	Two permits for large quantity medical waste generation and treatment: one covering the Biosciences Directorate; Safety and Environmental Protection Directorate (Health Services Department); Nonproliferation, Homeland and International Security Directorate (Forensic Science Center, Medical Photonics Lab, Culture Growth Lab); Energy and Environment Directorate (Tissue Culture Lab); and Chemistry and Materials Science Directorate; the second covering medical waste generation and treatment activities planned for the Biosafety Level 3 (BSL-3) laboratory.	Limited Quantity Hauling Exemption for small quantity medical waste generator.
Air	BAAQMD issued 181 permits for operation of various types of equipment, including boilers, emergency diesel generators, cold cleaners, degreasers, printing press operations, manual wipe-cleaning operations, metal machining and finishing operations, silk-screening operations, silk-screen washers, paint spray booths, adhesives operations, optic coating operations, drum crusher, semiconductor operations, diesel air-compressor engines, groundwater air strippers, soil vapor extraction units, material-handling equipment, sewer diversion system, oil and water separator, fire-test cells, gasoline-dispensing operation, paper-pulverizer system, and firing tanks.	SJVAPCD issued 43 permits for operation of various types of equipment, including emergency diesel generators, paint spray booth, groundwater air strippers, soil vapor extraction units, woodworking cyclone, gasoline-dispensing operation, explosive waste treatment units, drying ovens, and the Contained Firing Facility.
Storage tanks	Seven operating permits covering 10 underground petroleum product and hazardous waste storage tanks: 111-D1U2 Permit No. 6480; 113-D1U2 Permit No. 6482; 152-D1U2 Permit No. 6496; 271-D2U1 Permit No. 6501; 321-D1U2 Permit No. 6491; 365-D1U2 Permit No. 6492; and 611-D1U1, 611-G1U1, 611-G2U1, and 611-O1U1 Permit No. 6505.	One operating permit covering three underground petroleum product tanks assigned individual permit numbers: 879-D1U1 Permit No. 006785; 879-G3U1 Permit No. 007967; and 882-D1U1 Permit No. 006530.

Table 2-2 Permits Active in 2005 (continued)

Type of permit	Livermore site[a][b]	Site 300[a][b]
Sanitary sewer	Discharge Permit 1250[c] (2004/2005 and 2005/2006[d]) for discharges of wastewater to the sanitary sewer. Permit 1510G (2004/2006[e]) for discharges of groundwater from CERCLA restoration activities to the sanitary sewer.	
Water	WDR Order No. 88-075 for discharges of treated groundwater from Treatment Facility A to recharge basin.[f] WDR Order No. 95-174, NPDES Permit No. CA0030023 for discharges of storm water associated with industrial activities and low-threat nonstorm water discharges to surface waters. WDR Order No. 99-08-DWQ, NPDES California General Construction Activity Permit No. CAS000002; Terascale Simulation Facility, Site ID No. 201C317827; Soil Reuse Project, Site ID No. 201C305529; National Ignition Facility, Site ID No. 201C306762; Building 583 Project, Site ID No. 201C332958; Arroyo Seco Water Management Plan, Site ID No. 201C335224; and A-4 Parking Lot, Site ID No. 201C333137; for discharges of storm water associated with construction activities affecting 0.4 hectares (1 acre) or more. FFA for groundwater investigation/remediation. NWPs 27, 13, and 7 for the implementation of the Arroyo Seco Management Plan.	WDR Order No. 93-100 for post-closure monitoring requirements for two Class I landfills. WDR Order No. 96-248 for operation of two Class II surface impoundments, a domestic sewage lagoon, and percolation pits. WDR Order No. 97-03-DWQ, NPDES California General Industrial Activity General Permit No. CAS000001 for discharge of storm water associated with industrial activities. WDR Order No. 99-08-DWQ, NPDES California General Construction Activity Permit No. CAS000002: Surface Impoundments Closure and Tanks Installation Project, Site ID No. 5S39C334065; Mid-Elk Ravine CRLF Project, Site ID No. 5S39C335461; WDR Order No. 97-242, NPDES Permit No. CA0082651 for discharges of treated groundwater from the eastern General Services Area treatment facility.[g] WDR Order No. 5-00-175, NPDES Permit No. CAG995001 for large volume discharges from the drinking water system that reach surface waters. NWP 27 for enhancing mid-Elk Ravine red-legged frog breeding ponds. Water Quality Certification for mid-Elk Ravine red-legged frog breeding ponds, WDID # 5B39CR00047. NWP 14 for installing lower Elk Ravine culvert. Water Quality Certification for installing lower Elk Ravine culvert, WDID # 5B39CR00089. FFA for groundwater investigation/remediation. 34 registered Class V injection wells.[h]

a Numbers of permits are based on actual permitted units or activities maintained and renewed by LLNL during 2005.
b See Acronyms and Abbreviations for list of acronyms.
c Permit 1250 includes wastewater generated at Site 300 and discharged at the Livermore site.
d The Discharge Permit 1250 period is from May 15 to May 14; therefore, two permits were active during the 2005 calendar year.
e Permit 1510G is a two-year (January to December) permit.
f Recharge basins referenced in WDR Order No. 88-075 are located south of East Avenue within Sandia National Laboratories/California boundaries.
g This permit was rescinded on August 8, 2005 by the Central Valley RWQCB after the substantive requirements of the permit were incorporated into the CERCLA Record of Decision.
h One injection well was closed on August 5, 2005, reducing the total to 33.

Site 300: The hazardous waste management facilities at Site 300 consist of three operational RCRA-permitted facilities. The Explosives Waste Storage Facility and Explosives Waste Treatment Facility are permitted to store and treat explosives waste only. The Building 883 Container Storage Area is permitted to store routine facility-generated waste such as spent acids, bases, contaminated oil, and spent solvents. See **Tables 2-2** and **2-3** for a summary of active permits and inspections, respectively, at Site 300 in 2005.

DTSC conducted the 2005 inspection of Site 300 on June 16 and 21, 2005. No violations were issued in the summary of observations at the conclusion of the inspection.

Hazardous Waste Reports

LLNL completed two annual hazardous waste reports, one for the Livermore site and the other for Site 300, that addressed the 2005 transportation, storage, disposal, and recycling of hazardous wastes at the respective sites. The 2005 Hazardous Waste Report-Main Site and 2005 Hazardous Waste Report-Site 300 were submitted to the DTSC by April 1, 2006.

Hazardous Waste Transport Registration

Transportation of hazardous waste over public roads (e.g., from one LLNL site to another) requires DTSC registration (22 CCR 66263.10). DTSC renewed LLNL's registration in November 2005.

Waste Accumulation Areas

LLNL Programs maintain waste accumulation areas (WAAs) in compliance with waste generator requirements specified in 40 Code of Federal Regulations (CFR) Part 262, and Title 22 California Code of Regulations (CCR) Part 66262.34, for the temporary storage (less than 90 days) of hazardous waste prior to transfer to a treatment, storage, and disposal facility. In January 2005, there were 23 WAAs at the Livermore site. During 2005, twelve temporary WAAs were put into service, while seven temporary WAAs and one permanent WAA were taken out of service. Program representatives conducted inspections at least weekly at all WAAs to ensure that they were operated in compliance with regulatory requirements. At the Livermore site, 1368 prescribed WAA inspections were conducted.

At Site 300 during 2005, two WAAs were in operation; three temporary WAAs were put into service, while four temporary WAAs were taken out of service. Program representatives conducted 131 prescribed WAA inspections at Site 300.

Table 2-3. Inspections and tours of Livermore site and Site 300 by external agencies in 2005

Medium	Description[a]	Agency[a]	Date	Finding[a]
Livermore Site				
Waste	Hazardous waste facilities CEI	DTSC	4/25, 4/26, 4/27, 5/5	Received the initial inspection report and SOOs 5/5. There were no violations of hazardous waste laws, regulations or requirements. LLNL is waiting for DTSC's final report.
	Hazardous waste facilities ESI	DTSC	1/26, 1/27, 1/31 10/31, 11/1	Received two initial inspection reports on 1/31 and 11/1 detailing SOOs. There were no violations of hazardous waste laws, regulations or requirements. DTSC sent a final report on 6/9/06 and issued a Class II violation, which LLNL requested to be reduced to a minor violation.
	Medical waste	ACDEH	9/29	No violations
	Waste tire management	ACDEH	6/23	No violations
Air	97 emission sources	BAAQMD	4/6, 5/12, 6/29, 9/22	No violations
Sanitary sewer	Annual compliance sampling	LWRP	10/4–10/5	No violations
	Categorical sampling			
	Bldg. 153		10/4	No violations
	Bldg. 321C		10/12	No violations
Storage tanks	Compliance with underground storage tank requirements and operating permits	ACDEH	3/14, 4/18, 9/20, 9/27	No violations
Site 300				
Waste	Permitted hazardous waste operational facilities (EWTF, EWSF, Building 883 CSA), RCRA-closed, post-closure permitted facility Building 829 Open Burn Facility, Building 883 WAA, and a review of hazardous waste-related documentation	DTSC	6/16, 6/21	Received no violations in initial inspection report and SOOs.
	Biennial inspection of terminal (transportation)	CHP	1/12	Received one violation for an air leak at a break relay valve. It was repaired.
Air	35 emission sources	SJVAPCD	11/16, 12/12	No violations
	Asbestos removal		3/21	No violations
Water	Permitted operations	CVRWQCB	4/14 10/27	No violations
Storage tanks	Compliance with underground storage tank requirements and operating permits	SJCEHD	3/22, 9/28, 11/10	No violations

a See Acronyms and Abbreviations for list of acronyms.

California Medical Waste Management Act

All LLNL medical waste management operations comply with the California Medical Waste Management Act, which establishes a comprehensive program for regulating the management, transport, and treatment of medical wastes that contain substances that may potentially infect humans. The program is administered by California Department of Health Services and is enforced by the Alameda County Department of Environmental Health (ACDEH).

LLNL is registered with the ACDEH as a generator of medical waste and has a treatment permit. No violations were issued as a result of the September 2005 ACDEH inspection of buildings at LLNL Health Services and the Biosciences Directorate. (See **Tables 2-2** and **2-3**.)

Radioactive Waste and Mixed Waste Management

LLNL manages radioactive waste and mixed waste in compliance with applicable sections of DOE Order 435.1, as described in LLNL's ES&H Manual, Document 36.1, "Hazardous, Radioactive, and Biological Waste Management Requirements." LLNL has also developed and maintains the Radioactive Waste Management Basis (LLNL 2006), which summarizes radioactive waste management controls relating to waste generators and treatment and storage facilities.

Federal Facility Compliance Act

LLNL is continuing to work with DOE to maintain compliance with the Federal Facilities Compliance Act Site Treatment Plan (STP) for LLNL that was signed in February 1997. LLNL completed 65 milestones during 2005; of the 65 milestones completed, 46 of the milestones had dates beyond 2005 (ranging from 2006 to 2011). In addition to completing the 19 milestones from 2005, LLNL requested extensions for six milestones that were due in 2005. The six milestones were associated with 3.4 cubic meters of waste.

There was a major effort to reduce the volume of waste stored at LLNL. Through this effort LLNL was able to reduce the volume of waste protected by the STP by more than 456 cubic meters. DTSC granted the milestone extensions because of the progress LLNL made toward completion of the milestones and the overall progress made in reducing the amount of mixed waste stored at LLNL.

Reports and certification letters were submitted to DOE as required. LLNL continued to pursue the use of commercial treatment and disposal facilities that are permitted to accept mixed waste. These facilities provide LLNL greater flexibility in pursuing the goals and milestones set forth in the STP.

Toxic Substances Control Act

The Federal Toxic Substances Control Act (TSCA) and implementing regulations found in 40 CFR Part 700-789 govern the uses of newly developed chemical substances and TSCA-governed waste by establishing the following partial list of requirements: record keeping, reporting, disposal standards, employee protection, compliance and enforcement, and cleanup standards.

In 2005, LLNL generated TSCA-regulated polychlorinated biphenyl (PCB) waste from electrical equipment contaminated with PCBs, liquid PCBs used to calibrate analytical equipment, and asbestos from building demolition or renovation projects.

All TSCA-regulated waste was disposed in accordance with TSCA, state, and local disposal requirements except for radioactively contaminated PCB waste. Radioactive PCB waste is currently stored at one of LLNL's hazardous waste storage facilities until an approved facility accepts this waste for final disposal.

Air Quality and Protection

Clean Air Act

All activities at LLNL are evaluated to determine the need for air permits. Air permits are obtained from the Bay Area Air Quality Management District (BAAQMD) for the Livermore site and from the San Joaquin Valley Air Pollution Control District (SJVAPCD) and/or BAAQMD for Site 300. Both Air Districts are overseen by the California Air Resources Board (CARB).

In 2005, LLNL operated 181 permitted air emission sources at the Livermore site and 43 permitted air emission sources at Site 300 (see **Table 2-2**). During the year, the BAAQMD performed four Livermore site inspections of 97 emission sources, and the SJVAPCD performed two Site 300 inspections of 35 emission sources. Both the BAAQMD and the SJVAPCD found all inspected sources to be in compliance with the applicable air emission regulations and permit conditions. As a result, no violations were issued. The dates and findings of the inspections are identified in **Table 2-3**.

In addition, the Livermore site continues to maintain a Synthetic Minor Operating Permit (SMOP), which was issued by the BAAQMD in 2002. The Livermore site initially had the potential to emit regulated air pollutants from permitted and permit-exempt sources in quantities exceeding federal Title V limits. In lieu of obtaining a Title V permit, LLNL opted to obtain and maintain a SMOP for the Livermore site. A SMOP places enforceable limits on the facility's operations to ensure the emission from the facility's permitted and permit-exempt sources stay well below the Title V limits for regulated air pollutants. The Livermore site is restricted by the SMOP to 31.8 MT (35 tons) per year for nitrogen oxides (NOx), 31.8 MT (35 tons) per year of precursor organic compounds, 20.9 MT (23 tons) per year for any combination of hazardous air pollutants (HAP), and 8.2 MT (9 tons) per year for any single HAP. The actual air pollutant emissions from the Livermore site are identified in Chapter 4.

In 2005, two significant air emission regulations were enacted. The first was CARB's "Airborne Toxic Control Measure for Stationary Compression Ignition Engines" (ATCM), and the second was BAAQMD's revision to its list of Toxic Air Contaminants (TACs) and associated "trigger levels" (i.e., emission limits).

The CARB ATCM established reduced particulate matter (PM) emission standards for diesel-fueled compression ignition generators and air compressors, and required, in certain instances, replacement of such generators and air compressors that cannot meet the new PM emission standards. LLNL has 89 permitted generators and 3 permitted air compressors at the Livermore site that are affected by the ATCM. Initially, 61 of the generators required replacement pursuant to the ATCM. However, LLNL was able to reclassify 47 of the initial 61 generators, by limiting their usage and modifying their permits, to an equipment status that would not require replacement of the generators under the ATCM. As a result, LLNL saved an estimated $5,500,000 in generator replacement costs through the permit modification process. LLNL has 16 permitted diesel generators at Site 300 that are affected by ATCM. None of these generators require replacement under the ATCM.

In July 2005, an uncontrolled wildland fire was ignited west of Site 300 by an arsonist. Approximately 4100 acres of public and private land adjacent to Site 300 were consumed by the fire; about 2100 acres burned at Site 300. Suppression of the wildland fire at Site 300 was attributed by Fire Department and the California Department of Forestry (CDF) personnel to the fire line perimeters established by LLNL's annual prescribed burn. If it had not been for the prescribed burn, the wildland fire would have consumed the process areas within Site 300 and an estimated additional 10,000 acres of public and private lands. The potential public exposure to PM and NOx emissions from the additional burning of 10,000 acres would have been, at a

minimum, 100 tons of PM and 40 tons of NOx. SJVAPCD representatives acknowledged and commended LLNL Fire Department personnel for their role in preventing the spread of the fire.

National Emission Standards for Hazardous Air Pollutants, Radionuclides

To demonstrate compliance with Title 40 of the Code of Federal Regulations Part 61, Subpart H (the National Emission Standards for Hazardous Air Pollutants [NESHAPs] for radiological emissions from DOE facilities), LLNL is required to monitor certain air release points and evaluate the maximum possible dose to the public. These evaluations include modeling dose (using EPA-sanctioned computer codes) based on air effluent (source emission) and air surveillance monitoring and assessing dose from small sources based on air surveillance monitoring. The *LLNL NESHAPs 2005 Annual Report* (Larson et al. 2006), submitted to EPA, reported that the estimated maximum radiological doses that could have been received by a member of the public were 0.065 μSv (0.0065 mrem) for the Livermore site and 0.18 μSv (0.018 mrem) for Site 300 in 2005. The reported doses include contributions from both point and diffuse sources. The totals were well below the 100 μSv/y (10 mrem/y) dose limits defined by the NESHAPs regulations. Additional information on the data is described in Chapter 7.

In 2005, LLNL continuously monitored radionuclide emissions from Building 331 (the Tritium Facility), Building 332 (the Plutonium Building), and portions of five other facilities (see Chapter 4). There were no unplanned atmospheric releases at the Livermore site or at Site 300 in 2005. Monitoring activities and results related to air are described further in Chapter 4.

Water Quality and Protection

Clean Water Act and Related State Programs

Preserving clean water is an objective of local, state, and federal regulations. The National Pollutant Discharge Elimination System (NPDES) under the federal Clean Water Act (CWA) establishes permit requirements for discharges into waters of the United States. In addition, the State of California, under the Porter-Cologne Water Quality Control Act, requires permits, known as Waste Discharge Requirements (WDRs), for any waste discharges affecting the beneficial uses of waters of the state. These permits, as well as water quality certification for discharges authorized under Section 401 of the CWA, are issued by local Regional Water Quality Control Boards

(RWQCBs) and the State Water Resources Control Board. RWQCBs enforce both the regional and state issued permits. Section 401 state certifications are required when the Army Corps of Engineers issues permits under Section 404 of the CWA. Several other agencies issue other water-related permits. The Livermore Water Reclamation Plant (LWRP) requires permits for discharges to the city's sanitary sewer system. The Safe Drinking Water Act requires registration with the EPA and management of injection wells to protect underground sources of drinking water.

Water-related permits and inspections from outside agencies are summarized in **Tables 2-2** and **2-3**, respectively. LLNL received one Notice of Violation (NOV) from the LWRP in April 2005 for exceeding the maximum pH limit of 10. No other enforcement actions were taken against LLNL by other water-related regulatory agencies in 2005. See **Table 2-4** for a summary of nonconformance with water-related permits identified by LLNL.

Table 2-4. Water-related permit nonconformance

Permit No[a]	Nonconformance[a]	Date(s) of nonconformance	Description–solution[a]
1250, LWRP sanitary sewer permit	Excursion above pH permit limit of 10; approximately 300-600 gallons of effluent discharged to the LWRP with a pH of 11.6.	4/6/05-4/7/05	Remainder of effluent captured and contained on site by Sewer Diversion Facility. LLNL received an NOV from the LWRP.
CAS000002, WDID No. 201C305529 ALP	Soil Reuse Project—Failure to conduct required predicted rain event inspections.	9/04 through 4/05[b]	Incidents were identified to project management and noted in the annual compliance certification dated 6/30/05.
CAS000002, WDID No. 201C306762 ALP	National Ignition Facility—Failure to document 2 required storm water inspections.	12/17/05 and 12/30/05	Incidents were identified to project management and noted in the annual compliance certification dated 6/28/05.

a See Acronyms and Abbreviations for list of acronyms.
b These dates reflect the construction reporting period of June 2004 through May 2005.

In 2005, LLNL completed three projects authorized by the Army Corps of Engineers (ACOE) under Nationwide Permits (NWPs). At the Livermore site, LLNL implemented a long-term management plan for Arroyo Seco that incorporates biotechnical bank and channel restoration techniques. The goals of the long-term plan are to ensure flood capacity conveyance while protecting water quality and habitat values in Arroyo Seco. The project included repairing existing bank erosion; constructing better transitions downstream of areas where the stream bank was previously stabilized by gabions and steel sheet-piling; constructing a berm system to redirect overland flow; and widening and lengthening the lower two-thirds of the project reach. This project was authorized under three NWPs: NWP 27 for Stream and Wetland Restoration Activities, NWP 13 for Bank Stabilization, and NWP 7 for Outfall Structures

and Maintenance. The SFBRWQCB waived certification and permitting requirements for this project.

At Site 300, LLNL completed the construction of mitigation habitat for the California red-legged frog. Two breeding pools were constructed in mid-Elk Ravine to compensate for the loss of habitat as a result of turning off artificial flow in the upper reaches of Elk Ravine. This project was authorized under NWP 27 and certified by the Central Valley RWQCB. Also at Site 300, LLNL installed a culvert in lower Elk Ravine to maintain year-round access of a fire trail. This project was authorized under NWP 14 for Linear Transportation Projects and certified by the Central Valley RWQCB.

Monitoring activities and results related to water permits are described in Chapter 4.

Tank Management

The CWA and California Aboveground Petroleum Storage Act require facilities meeting specific storage requirements to have and implement Spill Prevention Control and Countermeasure (SPCC) plans for aboveground, oil-containing containers, including equipment and tanks. ACDEH and San Joaquin County Environmental Health Department (SJCEHD) also issue permits for operating underground storage tanks containing hazardous materials or hazardous waste as required under the California Health and Safety Code.

LLNL manages its underground and aboveground storage tanks through the use of underground tank permits, monitoring programs, operational plans, closure plans and reports, leak reports and follow-up activities, and inspections. At LLNL, permitted underground storage tanks contain diesel fuel, gasoline, and used oil; aboveground storage tanks contain fuel, insulating oil, and process wastewater. Some nonpermitted wastewater tank systems are a combination of underground storage tanks and aboveground storage tanks. All permitted underground storage tanks were inspected by the regulating agencies in 2005. No violations were noted during the inspections. See **Table 2-3** for summary of inspections.

In 2005, LLNL conducted extensive, site-wide surveys of outdoor areas at both the Livermore site and Site 300 for aboveground oil containers of 55 gallons or greater. These activities were conducted in compliance with SPCC regulation updates promulgated in 2002. Updates to the SPCC plans for both the Livermore site and Site 300 will be completed in 2006.

Other Environmental Statutes

National Environmental Policy Act

The National Environmental Policy Act (NEPA) is our country's basic environmental charter. NEPA requires the federal government to do two things when they consider a proposed project or action: 1) consider how the action will affect the human environment, and 2) inform the public and involve them in the decision making process. LLNL activities must comply with the requirements of NEPA because they are generally funded by the federal government.

Federal agencies meet the first NEPA requirement by studying the impact a project would have on the human environment. The agency studies the components of the human environment that may be affected by the project, which may or may not include air, water, soil, biological resources, socio-economics, aesthetics, noise, or cultural resources. The results of their studies are written in a "NEPA document." Federal agencies meet the second requirement (inform the public) by distributing the NEPA documents. NEPA documents are made available in public reading rooms and on the internet, and are sometimes directly mailed to interested parties. Federal agencies often involve the public in their decisions about proposed projects by holding public meetings and asking for comments on their NEPA documents.

There are two types of NEPA documents: environmental impact statements (EISs) and environmental assessments (EAs). Environmental impact statements are prepared for major federal actions that significantly affect the quality of the human environment. In contrast, EAs are prepared for federal actions that will not have a significant impact on the environment. The federal agency decides which type of document to prepare after studying the impact to the environment.

Some projects do not require the preparation of either an environmental impact statement or an environmental assessment. These projects fit into categories of activities that are well understood and known to have no impact on the human environment. After an agency studies the environmental impacts of a project and determines that the project fits into one of these categories, no further documentation is required. Nonetheless, some federal agencies, including DOE at LLNL, choose to write a memorandum that describes the project and explains why it meets the criteria for being categorically excluded. These memoranda are referred to as CXs, Cat Xs, and Categorical Exclusions—technically, they are not actual NEPA documents.

The paragraphs that follow provide details about the NEPA documents and Categorical Exclusions that have been prepared for LLNL projects this year.

There were no LLNL projects in 2005 that required DOE EAs. Twelve categorical exclusion recommendations were approved by DOE. There were no proposed actions at LLNL that required separate DOE floodplain or wetlands assessments under DOE regulations in 10 CFR 1022.

In 2004, DOE published the draft *Site-wide Environmental Impact Statement for the Continued Operation of Lawrence Livermore National Laboratory (DOE/EIS-0348)* and *Supplemental Stockpile Stewardship and Management Programmatic Environmental Impact Statement (DOE/EIS-0236-53) (LLNL SW/SPEIS)*. The draft *LLNL SW/SPEIS* was issued for a 90-day public comment period (February 27 to May 27, 2004). Three public hearings were held in 2004: April 27 in Livermore, April 28 in Tracy, and April 30 in Washington, D.C. The final LLNL SW/SPEIS (DOE 2005) was published in March 2005, and a Record of Decision filed on November 29, 2005.

Since November 1992, the University of California (UC) and LLNL have implemented mitigation measures identified by the *1992 EIS/EIR*. An addendum to the *1992 EIS/EIR* was prepared in 1997. The measures are being implemented in accordance with the approved 1992 Mitigation Monitoring and Reporting Program associated with the *1992 EIS/EIR*. The 2000 mitigation monitoring report was published in 2003. Publication of the 2001 through 2004 mitigation monitoring reports is pending.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) applies to historically important places and to the preservation of prehistoric and historic resources of the United States. LLNL resources subject to NHPA consideration range from prehistoric archeological sites to remnants of LLNL's own history of scientific and technological endeavor. The responsibility to comply with the provisions of NHPA rests solely with DOE as a federal agency. LLNL and UC as its contractor operator support DOE NHPA responsibilities. LLNL does so with direction from DOE.

The two primary NHPA sections that apply to LLNL are Sections 106 and 110. Section 106 requires federal agencies to take into account the effects their undertakings may have on historic properties. The agencies must allow and consider comments of the federal Advisory Council on Historic Preservation. The Section 106 regulations outline a five-step review process that is conducted for individual federal actions. Section 110 sets forth broad affirmative responsibilities to balance agency missions with cultural values. Its purpose is to ensure full integration of historic preservation into federal agency programs.

LLNL has taken two approaches to streamline historic preservation efforts and focus on important historic properties under its management. First, DOE, UC, and the State Historic Preservation Officer (SHPO) reached an agreement in July 2003 that governed historic preservation program activities until resource inventory and assessment activities specified in the agreement were complete. The goal was to reduce the amount of paperwork necessary to ensure protection of important historic properties by reaching a consensus on where and how to effectively focus LLNL's efforts. The second goal, as is specified in the agreement, was to complete within a reasonable timeframe an inventory of places (prehistoric and historic, archeological, and architectural) that meets a statutory threshold of historic importance. The inventory of places specified in the agreement was completed in 2004. In 2005, LLNL prepared a document describing the inventory of prehistoric and historic archaeological resources and recommending those that appear to meet the statutory threshold of historic importance. DOE, in consultation with the SHPO, used the information contained in the document to formally determine that five of LLNL's archaeological resources qualify for listing in the National Register of Historic Places. DOE, in consultation with the SHPO, also formally determined that six buildings, two historic districts, and one object at LLNL are eligible for listing in the National Register of Historic Places. Until a new agreement is in place, LLNL and NNSA continue to consult with the SHPO for individual actions in accordance with the July 2003 agreement.

With the inventory and assessment completed, DOE, UC, the SHPO, and the Advisory Council on Historic Preservation (ACHP) initiated discussions toward the development of a new agreement that would govern how these National Register-eligible properties will be managed. To assist in these discussions, LLNL prepared a draft archaeological resources treatment plan in July 2005 and a draft historic buildings treatment plan in September 2005 that describe specific resource management and treatment strategies that could be implemented by DOE, in cooperation with LLNL, to ensure that these properties are managed in a manner that considers their historic values. At the end of 2005, these documents were under consideration by DOE.

Antiquities Act

Provisions of the Antiquities Act provide for recovery of paleontological remains. After the discovery of mammoth remains in conjunction with the National Ignition Facility construction in 1997, LLNL has remained vigilant for other fossil finds. No remains subject to the provisions of the Antiquities Act were identified in 2005.

Endangered Species Act and Sensitive Natural Resources

Requirements of the U.S. Endangered Species Act, the California Endangered Species Act, the Eagle Protection Act, the Migratory Bird Treaty Act, and the California Native Plant Protection Act are met as they pertain to endangered species, threatened species, and other special-status species (including their habitats) and designated critical habitats that exist at the LLNL sites. For example, DOE consults with the U.S. Fish and Wildlife Service (USFWS) when activities have the potential to result in impacts to federally endangered or threatened species. The following list describes the highlights of recent consultations and analyses conducted in reference to the federal Endangered Species Act.

- Routine maintenance, including vegetation trimming and culvert replacement, of Arroyo Las Positas at the Livermore site was conducted under the 1998 Biological Opinion from the USFWS.
- A biological assessment (BA) for the implementation of the Arroyo Seco Management Plan was prepared and submitted to USFWS on August 14, 2003. The USFWS issued a biological opinion for this project on June 10, 2005. Work was completed under this biological opinion during the summer of 2005. Monitoring of the restoration at the Arroyo Seco site is required for five years after the completion of this project.
- On December 13, 2004, a BA was submitted to the USFWS for closure of two Site 300 Class II Surface Impoundments, which were built to contain and evaporate explosives formulation and process operations nonhazardous wastewater and nonhazardous photo process rinse water. The USFWS completed the biological opinion for this project on March 21, 2005. Work under this biological opinion was completed during the summer and fall of 2005. As required mitigation for impacts to California tiger salamander *(Ambystoma californiense)* habitat during the removal of the surface impoundments, a seasonal pool was created in the northwest portion of Site 300. Monitoring for California tiger salamanders was also conducted at the surface impoundment site after construction (winter 2005/2006) as required by the biological opinion for this project.
- A BA for the *LLNL SW/SPEIS* was prepared and submitted to the USFWS on April 9, 2004. It is currently being reviewed by the USFWS and being revised by LLNL to include more detailed environmental information.
- On June 6, 2005, the USFWS concurred with DOE that the creation of the Mid-Elk Ravine Wetland Enhancement Project (Site 300 Mid-Elk Ravine Mitigation Ponds) and the Upper Round Valley Culvert Replacement Project are not likely to adversely affect the California

tiger salamander. These projects are both included in the May 17, 2002, Biological Opinion for Routine Maintenance and Operations of Site 300, which was completed before the California tiger salamander was proposed for listing as threatened by the USFWS.

- In the summer and fall of 2005, the Mid-Elk Ravine Wetland Enhancement Project was completed. This project is included in the May 17, 2002, Biological Opinion for Routine Maintenance and Operations of Site 300 as mitigation for the termination of water discharge to artificial wetlands created initially from cooling tower blowdown near Buildings 865, 801, 827, and 851 that provided suitable habitat for California red-legged frogs.
- The proposed construction and operation of evidence receiving and temporary storage facilities, in support of the Forensic Science Center analyses programs, was reviewed in 2005 to determine the potential for this project to impact endangered species. Construction of the new facility is proposed to occur at the existing Building 858 complex which lies within the *Amsinckia grandiflora* preserve at Site 300. This project is not likely to result in any impacts to the endangered plant *Amsinckia grandiflora* or other listed species because all construction will occur within the developed area. Construction is scheduled to begin in 2006.

In 2005 and early 2006, the USFWS published three critical habitat final or proposed rules that are pertinent to LLNL. The final rule designating critical habitat for the California tiger salamander was issued on August 23, 2005 (USFWS 2005a). This designation did not include any critical habitat for California tiger salamanders at the Livermore site or Site 300.

On April 13, 2006, the USFWS published a final rule designating critical habitat for the California red-legged frog *(Rana aurora draytonii)* (USFWS 2006). This new critical habitat designation does not include any portion of the Livermore site or Site 300.

A proposed critical habitat designation was also issued for the Alameda whipsnake *(Masticophis lateralis euryxanthus)* on October 18, 2005, (USFWS 2005b). This proposal includes the southwestern portion of Site 300 (**Figure 6-16**). No portion of the Livermore site is included in the Alameda whipsnake critical habitat proposal.

Biological surveys for special-status species and monitoring results are described in Chapter 6.

Environmental Occurrences

In 2005, notification of environmental occurrences was required under a number of environmental laws and regulations as well as DOE Order 231.1A and DOE Manual 231.1-2. The orders and manual provide guidelines to contractor facilities regarding categorization and reporting of environmental occurrences to DOE and divides occurrences into categories.

LLNL's response to environmental occurrences is part of the larger on-site emergency response organization that includes representatives from Hazards Control (including the LLNL Fire Department), Health Services, Plant Engineering, Public Affairs, Safeguards and Security, and Environmental Protection. In 2005, one environmental incident, summarized in **Table 2-5**, was reportable under DOE Order 232.1A and was categorized as a Significance Category 4 reportable occurrence under Group 9, Noncompliance Notifications according to DOE Order 232.1A. DOE was notified of this incident. No occurrences were reportable under Group 5, Environmental.

Table 2-5 Environmental Occurrence reported under the Occurrence Reporting System in 2005

Date[a]	Occurrence category/group	Description[b]
April 20	Significance Category SC4 Occurrence under Group 9(2)	LLNL received an NOV from the City of Livermore Water Reclamation Plant for briefly exceeding the pH limit for high-pH bearing materials into the sanitary sewer. On April 6 and 7, the LLNL sewer monitoring complex experienced a high pH alarm. The pH of the captured effluent was 11.6; the maximum pH permit limit is 10. OR 2005-0032

a The date indicated is the date when the occurrence was categorized, not the date of its discovery.
b See Acronyms and Abbreviations for list of acronyms.

Contributing Authors

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